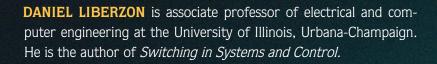This textbook offers a concise yet rigorous introduction to calculus of variations and optimal control theory, and is a self-contained resource for graduate students in engineering, applied mathematics, and related subjects. Designed specifically for a one-semester course, the book begins with calculus of variations, preparing the ground for optimal control. It then gives a complete proof of the maximum principle and covers key topics such as the Hamilton-Jacobi-Bellman theory of dynamic programming and linear-quadratic optimal control.

Calculus of Variations and Optimal Control Theory also traces the historical development of the subject and features numerous exercises, notes and references at the end of each chapter, and suggestions for further study.

• Offers a concise yet rigorous introduction
• Requires limited background in control theory or advanced mathematics
• Provides a complete proof of the maximum principle
• Uses consistent notation in the exposition of classical and modern topics
• Traces the historical development of the subject
• Solutions manual (available only to teachers)

DANIEL LIBERZON is associate professor of electrical and computer engineering at the University of Illinois, Urbana-Champaign. He is the author of *Switching in Systems and Control.*

"A very scholarly and concise introduction to optimal control theory. Liberzon nicely balances rigor and accessibility, and provides fascinating historical perspectives and thought-provoking exercises. A course based on this book will be a pleasure to take."
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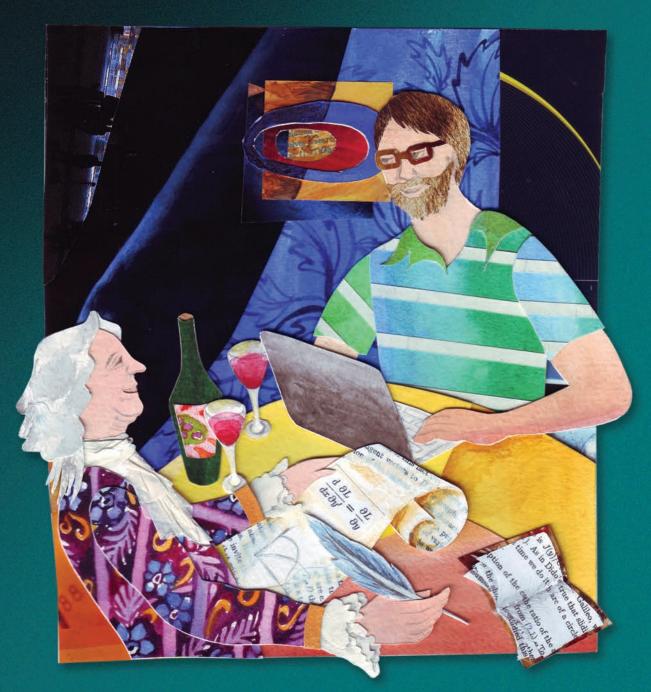
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LIBERZON

CALCULUS OF VARIATIONS AND OPTIMAL CONTROL THEORY

A Concise Introduction

DANIEL LIBERZON

PRINCETON